

## **Treatment of cloacal papilloma with 50% silver nitrate solution in chestnut-fronted macaws (*Ara severus*)**

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### *Abstract*

Cloacal papilloma is commonly found in Amazon parrots and macaws. There are many treatment options for cloacal papilloma. Chemical cautery is one of the recommended methods. In this study, 6 mature chestnut-fronted macaws (*Ara severus*) with cloacal papilloma were treated weekly with 50% silver nitrate solution. All tumors completely regressed after 2 to 5 weeks of treatment. One bird died after the second treatment from another cause. Three months after the last treatment, one bird died from internal papilloma in the esophagus and the crop. Recurrence was found in one bird at 6 months after the last treatment. The result suggested that cauterization with 50% silver nitrate solution was effective in the treatment of cloacal papilloma in macaws. However, recurrence of the tumor or papilloma in the gastrointestinal tract could be observed.

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**Keywords:** cloacal papilloma, macaw, silver nitrate solution

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## Introduction

Cloacal papilloma is a benign tumor at the cloacal mucosa. The disease is commonly found in Amazon parrots (*Amazona* spp.) and macaws (*Ara* spp. and *Anodorhynchus hyacinthinus*). It is also found in conures (*Aratinga* spp.) and hawk-head parrots (*Derophtus accipitrinus*) (Sundberg et al., 1986; Goodwin and McGee, 1993; Johne et al., 2002; Styles et al., 2004). Cloacal papilloma may cause straining to produce dropping, dropping staining on the feathers around the cloaca and blood in droppings. The lesion caused discomfort and may affect fertility (Dvorak et al., 1998). The diagnosis is based on histopathological interpretation (proliferation of the lining epithelium on fibrovascular stalk) (Sundberg et al., 1986).

From histopathological interpretation, papillomavirus is suspected to be the etiology of the disease. However, papillomavirus was not detected in birds with cloacal papilloma (Johne et al., 2002). On the other hand, many studies have shown that psittacid herpesvirus plays an important role in the development of cloacal papilloma (Johne et al., 2002; Styles et al., 2004). Until now, the pathogenesis of cloacal papilloma has not been fully understood.

There are several treatment options for cloacal papilloma such as surgical excision, cryosurgery, radiocautery and chemical cautery (Dvorak et al., 1998). In addition, laser therapy is used to treat wart and papilloma in human and animals (Yanofsky et al., 2012; Paczuska et al., 2014). Each method of treatment has different advantages and disadvantages. The disadvantages of surgical treatment are the difficulty of surgical procedure and the cost. On the other hand, chemical cautery is simple and cost-effective.

Chemical cautery with silver nitrate and silver nitrate solution are highly effective in treating wart in human (Ebrahimi et al., 2007; Lwegaba et al., 2008). Nevertheless, different concentrations of silver nitrate may affect the efficacy of treatment and complications that could occur (Amin et al., 2007). Silver nitrate has also been used to treat cloacal papilloma in birds (Gerlach, 1994). However, the treatment protocol and treatment results have never been recorded.

This report aimed to describe the treatment of cloacal papilloma with 50% silver nitrate solution in 6 chestnut-fronted macaws.

## Materials and Methods

**Animals and sample collection:** Six mature chestnut-fronted macaws (*Ara severus*), weighing 340-380 g, from a private captive breeder were presented with protruding masses from the cloaca and droppings accumulated on the feathers around the cloaca. The masses were between 10 to 16 mm in diameter, cauliflower-like shape and pink in color (Fig. 1a). Blood samples were collected from the wing vein for complete blood count (CBC), serum glutamic oxaloacetic transaminase (SGOT) and creatinine. Fresh fecal samples were collected and examined by direct smear method. Biopsy samples were collected with small sterile scissors and fixed in 10% buffered formalin. The fixed tissues were processed and

embedded in paraffin blocks. The tissue sections were cut at 4 µm and stained with hematoxylin and eosin stain (H&E). Papilloma was confirmed by histopathological examination.

**Treatment protocol:** Fifty percent silver nitrate solution was prepared as follows: 200 mg of silver nitrate (Emsure®, Merck, Germany) was kept in 1.5 ml eppendorf tube, 0.2 ml of distilled water was added before use. The mixed silver nitrate solution in one tube was used per only one cauterization. The solution was applied to the papilloma by a small sterile cotton swab for 1 minute. After cauterization, the mass was rinsed with normal saline for 1 minute. The mass was assessed on a weekly basis. The weekly treatment was repeated until the mass completely regressed.

## Results and Discussion

Blood profiles (CBC, SGOT and creatinine) were all in the normal range. Nematode eggs were not found in all fecal samples. Histological findings showed papillary hyperplastic columnar epithelium presented with chronic inflammation in the submucosa, which are the histopathological characteristics of cloacal papilloma (Sundberg et al., 1986) (Fig. 2).

All cloacal papillomas were cauterized with 50% silver nitrate solution. The papilloma turned white after cauterization (Fig. 1b). All cloacal papillomas regressed after each treatment and complete regression was noted after 2 to 5 treatments (Fig. 1c). Bird No. 2 died after the second treatment from another cause. No complications were observed. The treatment results are summarized in Table 1.

However, 3 months after the last treatment, bird No. 3 was found dead. At necropsy, a mass was found in the esophagus and the crop. Histopathology revealed stratified squamous or columnar epithelial cells on the fibrovascular support with many lymphoplasmacytic cell infiltration, which are the histopathological characteristics of papilloma. Moreover, 6 months after the last treatment, recurrence of cloacal papilloma was found in bird No. 4, therefore 50% silver nitrate solution was used for treatment and complete regression was noted after the 5<sup>th</sup> treatment.

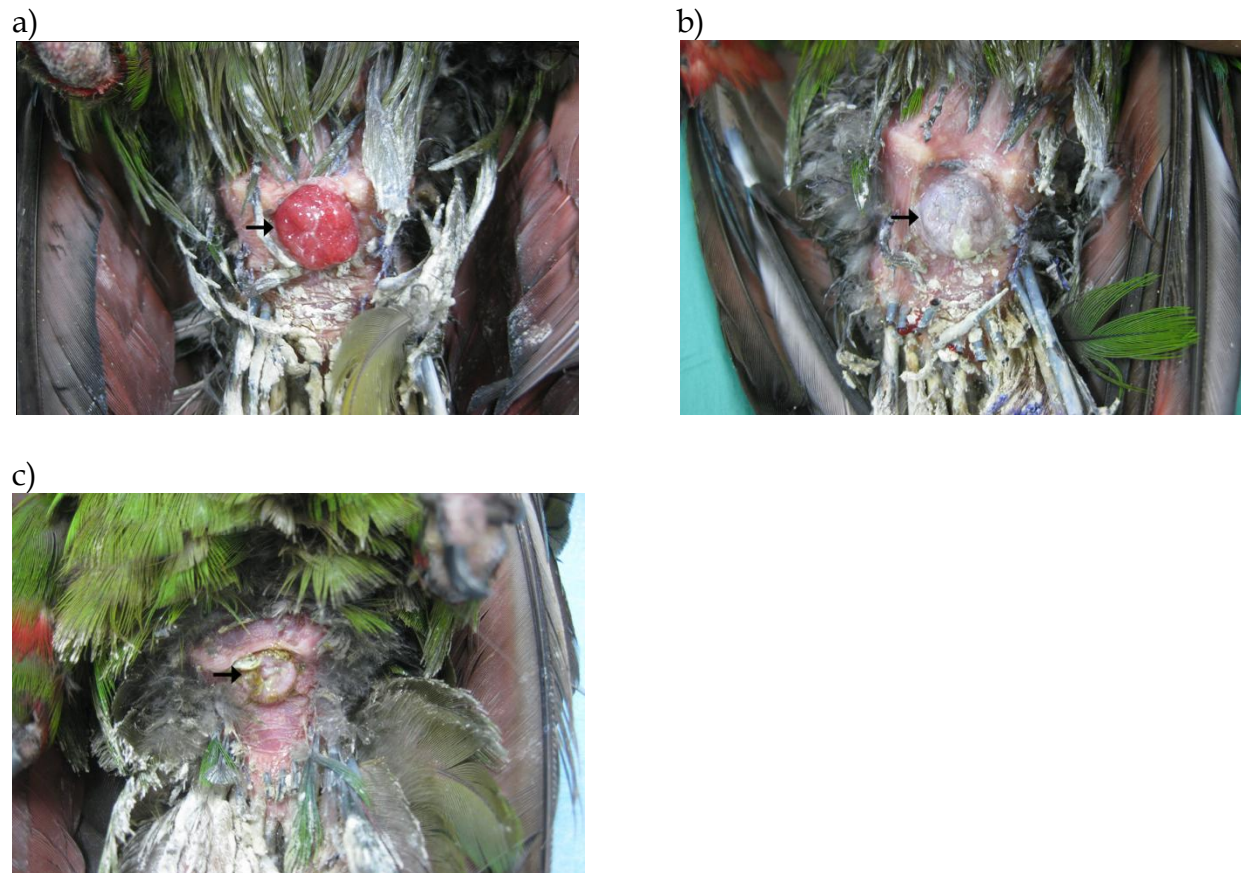
Although cloacal papilloma could be removed by surgery, it requires anesthesia and well-trained staff. Moreover, special surgical techniques such as cryosurgery, radiocautery and laser therapy require special equipment. Thus, surgical treatment may not be the most suitable choice for all cases. In this study, all cloacal papillomas completely regressed within the 5<sup>th</sup> cauterization with 50% silver nitrate solution. These results showed that 50% silver nitrate solution could be used effectively for the treatment of cloacal papilloma.

Previous studies have reported a wide range of silver nitrate concentrations for the treatment of human wart (Ebrahimi et al., 2007; Lwegaba et al., 2008). However, different concentrations of silver nitrate result in different histological effects on the tissue (Amin et al., 2007). The result of our study demonstrated that the concentration of 50% silver

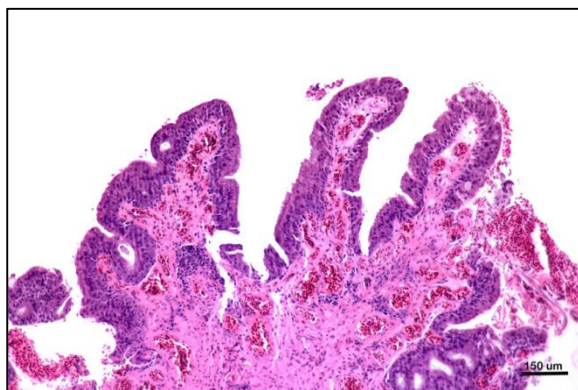
nitrate was high enough to treat the cloacal papilloma effectively.

In this study, small-sized mass tended to regress more rapidly than large-sized mass. Thus, it is recommended to start the treatment as early as

possible. From this study, applying silver nitrate solution by cotton swab made the cauterization procedure simple and precise. Moreover, silver nitrate solution was easy to wash after the treatment.



**Figure 1** a) The protruding cauliflower-like, pink mass from the cloaca of bird No. 1 presented with dropping accumulation on the feathers before treatment (black arrow). b) After the first treatment of cauterization, the mass turned white (black arrow). c) The cloacal papilloma completely regressed, observed in the 6<sup>th</sup> week (black arrow).



**Figure 2** The histopathological lesion of cloaca of bird No. 1; papillary fronds of columnar epithelial cells supported by the fibrovascular stroma in which the capillaries are congested and have lymphoplasmacytic cells infiltration. (H&E stain, bar = 150 µm)

From our study, cloacal papilloma recurrence was found in one bird and papilloma was found in the esophagus and the crop in another bird. According to previous reports, recurrence of cloacal papilloma is common (Gerlach, 1994; Gartrell et al., 2009). In addition, papilloma may be found in the gastrointestinal tract (Kennedy et al., 1996). Previous studies also showed that birds with cloacal papilloma had higher risk of developing bile duct carcinoma and pancreatic duct carcinoma compared to normal birds

(Hillyer et al., 1991; Gerlach, 1994). It is suggested that the chance of cloacal papilloma recurrence, internal papilloma, bile duct carcinoma and pancreatic duct carcinoma should be acknowledged by bird owners before treatment.

Even though cauterization with 50% silver nitrate solution is an effective, easy and inexpensive method, caution should be taken to ensure that the solution is only applied to the papilloma because silver nitrate can irritate and cause damage to the

surrounding normal tissue. Veterinarians should also wear protective glasses and rubber gloves when handling silver nitrate due to its irritant effect on the eyes and skin.

It is known that cloacal papilloma is friable and tends to break off which causes bleeding (Gartrell et al., 2009), therefore cauterizing with cotton swab should be done gently. Moreover, aggressive or fearful

birds should be sedated before cauterization to avoid accidental burn and damage of the surrounding tissue. Furthermore, small cloacal papilloma which has regressed after previous treatment may not be seen on the cloaca, so cotton swab should be used to turn the cloaca inside out to ensure complete regression of the mass.

**Table 1** Results of treatment with 50% silver nitrate solution cauterization

Bird No.	Sex	Mass size (mm)	Weeks of treatment					
			1	2	3	4	5	6
1	M	16	C*	C	C	C	C	N/O
2	M	16	C	C	D			
3	M	15	C	C	C	C	C	N/O
4	F	15	C	C	C	C	N/O	
5	F	10	C	C	N/O			
6	M	11	C	C	C	C	N/O	

\* C: cauterization with 50% silver nitrate solution, N/O: the mass was not observed and the treatment was terminated, D: died from another cause

In conclusion, this study is the first report of cloacal papilloma treatment in macaws in Thailand. The study demonstrated that 50% silver nitrate solution could be used effectively to treat cloacal papilloma in macaws without complications. It is also a non-invasive and cost-effective method.

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## บทคัดย่อ

### การรักษาเนื้องอกหูตที่ทวารร่วมของนกมาคอว์ chestnut-fronted (*Ara severus*)

#### ด้วยสารละลายซิลเวอร์ไนเตรต 50 เปอร์เซ็นต์

ธวัช เล็กดำรงศักดิ์<sup>1\*</sup> วิจิตร บรรณารักษ์<sup>2</sup>

เนื้องอกหูตที่ทวารร่วม (cloacal papilloma) พบได้บ่อยในนกแก้วแอมะซอนและนกมาคอว์ สามารถรักษาได้หลายวิธี การศึกษาครั้งนี้เพื่อประเมินประสิทธิภาพของสารละลายซิลเวอร์ไนเตรต 50 เปอร์เซ็นต์ ในการรักษาเนื้องอกหูตที่ทวารร่วมของนกมาคอว์ chestnut-fronted (*Ara severus*) จำนวน 6 ตัว โดยใช้สารละลายซิลเวอร์ไนเตรตแต้มเนื้องอกหูตที่ทวารร่วม สัปดาห์ละ 1 ครั้ง พบว่าเนื้องอกหูตที่ทวารร่วมของนกทั้งหมด หดหายไปหลังจากการจี้ด้วยสารละลายซิลเวอร์ไนเตรต 2 ถึง 5 ครั้ง ระหว่างการรักษา นก 1 ตัวเสียชีวิตด้วยสาเหตุอื่น หลังการรักษา 3 เดือน นก 1 ตัว เสียชีวิตจาก internal papilloma ในหลอดอาหารและกระเพาะพัก หลังการรักษา 6 เดือน พบการงอกใหม่ของเนื้องอกในนก 1 ตัว ดังนั้นสารละลายซิลเวอร์ไนเตรต 50 เปอร์เซ็นต์ สามารถใช้ในการรักษาเนื้องอกหูตที่ทวารร่วมได้อย่างมีประสิทธิภาพ แต่นกอาจกลับมาเป็นซ้ำหรือเสียชีวิตภายหลังจาก internal papilloma

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**คำสำคัญ:** เนื้องอกหูตที่ทวารร่วม นกมาคอว์ ซิลเวอร์ไนเตรต

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